

DOCUMENT RESUME

ED 321 370

EA 021 994

AUTHOR Schoppmeyer, Martin W.; Alvarez, William D.
TITLE School Finance Equity: An Elusive Goal.
PUB DATE Mar 90
NOTE 15p.; Paper presented at the Annual Meeting of the American Education Finance Association (Las Vegas, NV, March 15-18, 1990).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Educational Economics; *Educational Equity (Finance); Educational Finance; Elementary Secondary Education; *Equalization Aid; *Finance Reform; *State Aid; *State Legislation
IDENTIFIERS *Arkansas

ABSTRACT

Act 34, the School Finance Act of 1983, was legislated in Arkansas to provide financial equity for all school districts. The comparison of school equity before and after the passage of the school finance law on 14 different measures is the purpose of this paper. Equity is measured for two different years: 1982-1983, the last year before passage of the act; and 1987-1988, the most recent year with complete data. Bivariate regression is used to test the relationship between revenue per student, the dependent variable, and wealth per student, the independent variable. Pearson's product-moment correlation coefficient, slope, elasticity, and adjusted relationship values are also calculated to show changes in direction and size. Findings indicate that slightly less equity exists in Arkansas schools today than in 1982-1983, and that the school finance suit should be reopened. (LMI)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED321370

**SCHOOL FINANCE EQUITY:
AN ELUSIVE GOAL**

Martin W. Schoppmeyer
William D. Alvarez

Paper delivered at the American Education Finance Association Convention,
Las Vegas, Nevada, March 1990

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as
received from the person or organization
originating it.

☐ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

*Martin W.
Schoppmeyer*

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

EA 021 994

SCHOOL FINANCE EQUITY: AN ELUSIVE GOAL

Starting out in the early 1970's with the Serrano and Rodriguez cases, the courts have become progressively more involved with school finance, especially in issues of school finance equity. For after the Rodriguez case caused the need to file a financial equity suit in every state, this has become the pattern and each state has had singular experiences.

In Arkansas Alma v. Dupree was filed in 1977. It was heard in Chancery Court in 1980 and by the Arkansas Supreme Court in 1983. The result was that the courts uniformly rejected the then current state finance plan as providing the basis for the "general, suitable, and efficient" education required by the Arkansas constitution. The Arkansas General Assembly was called into special session in 1983 to correct the deficiencies. After a certain amount of discussion, it enacted Act 34, the School Finance Act of 1983 under which the state still operates with some minor modifications.

At the time of its passage, Act 34 was criticized on several bases. First, it restored state aid to wealthy districts which should have seen it cut in order to secure support from the members of the legislature from these districts. Therefore, not sufficient funding was given the poorer districts to enable them to equalize opportunity.

Second, the act had no required minimum millage. It did in the sense that there were penalties for falling below a certain amount, but actually created a situation in which it was at least theoretically possible to run schools with state aid alone with no local contribution.

Third, there was no cap on millages. This meant that a wealthy district could expend far more per pupil by raising its local taxes above the average. Fourth, there was no penalty for underassessment. Arkansas was, at the time of the passage of Act 34, undergoing a statewide property reassessment due to a suit brought by one county against the state. The contention of the plaintiff, upheld by the court, was that many counties were assessing real property far below its actual value. Hence, a mill of tax would yield only a fraction of what it should. Act 34 took no notice of this situation save for providing different wealth calculations for unreassessed and reassessed districts. It did not foresee what has occurred since. Namely, that the local assessors have once again permitted real property to slip far below the mandated twenty percent of value. This has created an artificial local tax base for schools. Therefore, the same millage charge in a complying district will yield a far higher proportion of wealth than in an underassessed district. Such a situation creates severe taxpayer inequity which in turn is reflected in attempts to achieve educational equity as it costs more to live in certain areas of the state and, in turn, entitles that area to less state aid.

The entire package seems capable of making the rich richer and the poor poorer.

Equity Measurements

By the end of the decade, it seemed possible to measure the degree of equity created by Act 34. Therefore, two years were selected, 1982-83, the last before the passage of the act and 1987-88 the most recent year for which all data was recorded.

A simple bivariate regression procedure was run for both 1982-83 and 1987-88, using revenue per student as the dependent variable and wealth per student as the independent variable. The Pearson's product-moment correlation coefficient (Pearson's r) was calculated. Slope, elasticity, and adjusted relationship values were also calculated. The values obtained from these measures were analyzed for changes of direction and size.

The Simple Correlation Coefficient

Results of the application of the simple correlation pointed to a stronger correlation (.7399) for 1987-88 than for 1982-83 (.6967); indicating a strong degree of positive correlation between revenue per student and wealth per student. Since the strength of the correlation did increase from 1982-83 to 1987-88, the correlation coefficient reflects a higher degree of inequity under the present state finance system than under the prior system.

Slope, Elasticity, and Adjusted Relationship Measures

While the slope and adjusted relationship measures, as measures of equity, indicated slight change toward equity in 1987-88; the elasticity suggested greater equity in 1982-83. Inasmuch as the correlation measures the relationship of two variables, the slope and elasticities assesses the magnitude of the relationship. The slope shows the size of the change in the dependent variable, revenue per student, associated with a one-unit change in the independent variable, wealth per student (Berne & Stiefel, 1984, pp. 29-30). The

value of the slope for 1982-83 was 0.0205 which may be interpreted as every change in assessed value of \$1,000.00 per student is associated with a \$00.0205 per student change in revenue. The 1987-88 slope value was 0.0191. Therefore, a \$00.0191 per student change in revenue may be associated with every change in assessed value of \$1,000 per student. It is quite evident that resulting differences between 1982-83 and 1987-88 are very minimal and do not indicate any significant movement toward equity.

The elasticity, like the slope, measures the magnitude of the relationship. However, the measurement is in terms of percentage changes rather than in unit changes (Berne & Stiefel, 1984, pp. 30-31). The elasticity measure for 1982-83 showed a value of 0.2427. This means that a one percent change in per student assessed valuation is associated with a .2427 percent change in per student revenue. In 1987-88, with an elasticity value of 0.2473, a one percent change in per student assessed valuation would be associated with a .2473 percent change in student revenue. Therefore, elasticity measures indicate a slightly more equitable situation in 1982-83 than in 1987-88. However, the difference is quite small (.0046).

Therefore, it must be concluded that as far as a correlation is concerned, equity has actually decreased since the passage of Act 34.

Other Measures

There are other measures of education equity. When measuring the horizontal equity of the two years examined (1982-83 compared to 1987-88); the mean, standard deviation, and totals of the variables utilized within the study were calculated. The variables examined

were average daily membership (ADM) of all districts; assessed valuation of property within all districts; and local revenue, state revenue, total revenue, district wealth, and revenue per student for all districts. Measures were student weighted so the object of the measures would be all Arkansas public school children. Percentage changes and totals in number of school districts, ADM, local revenue, state revenue, and total revenue were calculated for categories of ADM groups.

Also calculated was percentage changes and totals in number of districts, ADM, local revenue, state revenue, and total revenue in deciles for assessed valuation. For purposes of further examination and comparison, percentile distribution of total state and local revenue per student were determined for both years examined in the study.

To assess differences from 1982-83 to 1987-88 in horizontal equity, eleven revenue disparity measures were applied and analyzed. These measures were the range, the restricted range, the federal range ratio, the relative mean deviation, the McLoone index, the variance, the coefficient of variation, the standard deviation of logarithms, the Gini coefficient and Lorenz curve, Theil's measure, and the Atkinson index at varying E values. To better understand and differentiate the information made available through application of the eleven measures, the results were examined with consideration for the particular values embedded in each measure.

Measures of Horizontal Equity

The mean, standard deviation, and totals of the variables (ADM, assessed valuation, local revenue, state revenue, total revenue, wealth

and revenue per student, reflected increases in nearly all categories from 1982-83 to 1987-88. The state's ADM increased less than one percent (.0043) from 426,592 to 428,420 students. The mean ADM for the state increased from 1,153 to 1,302. While the mean assessed valuation of the state increased +99 percent from \$19,293,768 in 1982-83 to \$38,536,215 in 1987-88; the standard deviation of the state's assessed valuation increased +123 percent from \$42,262,604 in 1982-83 to \$94,628,624 in 1987-88. Total assessed valuation for the state increased from \$7,138,694,197 in 1982-83 to \$12,678,414,897 in 1987-88. When comparing the mean of wealth of 1982-83 to 1987-88, it was found there was a +77 percent increase (\$16,734 to \$29,593). Wealth totals increased from \$6,005,596 to \$8,954,963 when comparing 1982-83 to 1987-88 with the standard deviation showing a +40 percent increase from a 1982-83 figure of \$13,261 to \$18,679 in 1987-88.

When examining changes in revenue from 1982-83 to 1987-88, it was found that the state's public school districts experienced increases in revenues at both the local and state levels. Total revenue increased from \$603,108,609 to \$977,940,260, a +62 percent increase with an increase of +87 percent in distributed state revenue and a +32 percent increase in local revenue. The mean for local revenue was \$749,072 in 1982-83 compared to \$1,119,496 in 1987-88. Comparison of the standard deviations in local revenues revealed a +55 percent increase from \$2,202,053 in 1982-83 to a 1987-88 standard deviation in local revenues of \$3,414,709. Local revenue totals increased from \$277,156,784 to \$368,314,276 during the years of the study. State revenue increased from \$325,951,825 in 1982-83

to a distributed total of \$609,625,985 in 1987-88. The 1982-83 state revenue mean was \$880,951 increasing to \$1,852,967 in 1987-88. The standard deviation of state revenue increased from \$1,508,630 to \$2,856,104. When comparing 1982-83 to 1987-88 the mean percentage increases were +49 percent for local revenue, +110 percent for state revenue, and +82 percent for total revenue.

Calculation of the mean and standard deviation for revenue per student during the years 1982-83 and 1987-88 resulted in finding that the revenue per student mean increased from \$1,414 in 1982-83 to \$2,283 for 1987-88, a +61 percent increase while the standard deviation increased +49 percent from \$377 in 1982-83 to 1987-88 figure of \$562.

The Range

The range of revenue per student by district has increased immensely since 1982-83. The 1982-83 range was 4,610 while in school year 1987-88, the range had increased to 8,425. The percentage increase was 82.75 percent. In 1982-83, the lowest total revenue per student district received \$1,005 per student with the highest total revenue per student district receiving \$5,615 revenue per student. In 1987-88, the lowest total revenue per student district received \$1,507 per student with the highest total revenue per student district receiving \$9,932 revenue per student. Dollars per student for the lowest total revenue per student district increased \$502 (49.95 percent increase) while the highest total revenue per student district received \$4,317 (76.88 percent increase) more per student in 1987-88 than received in 1982-83. In 1987-88, the

highest total revenue per student district received \$8,425 more per student (the 1987-88 range) than the lowest district. In comparison, the difference from lowest to highest total revenue per student districts in school year 1982-83 was \$4,610 per student (the 1982-83 range). The range, which is more sensitive to extreme values in the distribution of revenue, clearly indicates greater equity in 1982-83 when the state employed a prior school finance formula than in 1987-88 when Act 34 was utilized.

The Restricted Range

The restricted range for 1982-83 was 839 while in 1987-88 it increased to 1,148. The percentage increase from 1982-83 to 1987-88 was 36.83 percent. Values for revenue per student at the 95th percentile was 1,972 in 1982-83 and 3,111 in 1987-88. These values reflect a 57.76 percent increase. Values for revenue per student at the 5th percentile was 1,133 in 1982-83 and 1,963 in 1987-88; reflecting a 73.26 percent increase. The restricted range indicates a more equitable distribution of revenue during school year 1982-83 than in 1987-88.

The Federal Range-Ratio

The federal range-ratio value for 1982-83 was 0.7405 compared to a value of 0.5848 for 1987-88. Although the restricted range tends to indicate increasing disparity, the calculated values for the federal range-ratio indicate slight movement toward greater equity at the 95th and 5th percentile range during 1987-88. The greatest increase in percentage change was at the 25th percentile (+96.24) with the

50th percentile increasing in revenue per student by +65.96 percent. However, there were positive increases in percentage changes of significant amounts at all levels. While the 1st percentile percentage change was +48.24 percent, the 99th percentile percentage change was +29.52.

Relative Mean Deviation

The relative mean deviation which is the value of the differences between each district's per student revenues and mean per student revenues, divided by the total revenue in the distribution indicates very slight improvement in equity measures from 1982-83 to 1987-88. The 1982-83 relative mean deviation was 0.1391 while in 1987-88, the value was 0.0988; a difference of 0.0403.

Standard Deviation of Logarithms

Like the relative mean deviation, the standard deviation of logarithms expressed very slight movement toward greater equity. Application of the measure revealed a value of 0.1730 for 1982-83 and 0.1306 for 1987-88; a difference of 0.0424. It must be remembered that both the standard deviation of logarithms and the relative mean deviation are dependent upon the mean, which tends to obscure comparisons over time.

Variance

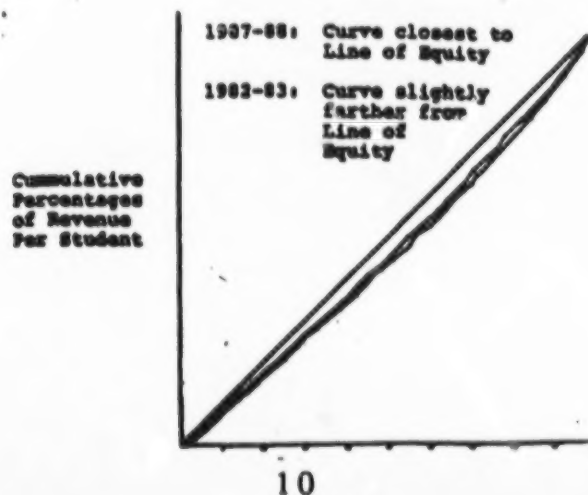
The variance is the average of the squared deviations of each revenue figure from the mean revenue. In 1982-83 the variance was 92,363 compared to 159,763 for 1987-88. The significant difference

in the values for each year indicates greater inequity in revenue distribution in 1987-88. The smaller the value, the smaller the variation from the mean and the closer to equity. The variance, as the range and restricted range, suggests a more equitable distribution of revenues occurred in 1982-83.

Coefficient of Variation

The standard deviation suffers from the range's problem of being overly sensitive to changes in scale. The solution is similar to that adopted for the federal range ratio. The standard deviation is divided by the mean. The resulting ratio is known as the coefficient of variation which can be multiplied by one hundred and expressed as a percent. The coefficient of variation for 1982-83 was 0.2150 (21.50 percent). The value for 1987-88 was 0.1751 (17.51 percent). Again the difference (0.0399) is very similar to the differences for the two years studied with the relative mean deviation and the standard deviation of logarithms. Application of the measure of coefficient of variation tends to suggest only slight movement toward greater equity.

Lorenz Curves For 1982-83 and 1987-88



The Gini Coefficient and Lorenz Curve

The Lorenz curve compared the changes in the dispersion of per student revenues from 1982-83 to 1987-88, relative to a line of perfect equity. The Gini coefficient provides a means of quantifying the area between the plotted curves and the line of perfect equity. The Lorenz curves represented Gini coefficients of 0.0961 for 1982-83 and 0.0689 for 1987-88. The curve reflected a very slight movement toward the line of perfect equity in 1987-88. However, like the other measures which indicate movement toward greater equity, the improvement is not significantly greater.

McLoone Index

The McLoone index, which is concerned with the dollars required to raise the lower half of students to the state median, showed a slight improvement from 1982-83 to 1987-88. The index for 1982-83 was 0.9232 while in 1987-88, the index was 0.9447. The increase in the index was .0215 from 1982-83 to 1987-88. With the McLoone index, unlike most other equity measures, the larger the index, the closer to equity.

Theil's Measure

Theil's measure shows how far each student is from receiving an equal share of revenue. The coefficient for 1982-83 resulting from the application of the Theil measure was 0.0191 while the 1987-88 coefficient was 0.0117. The measures indicate minimal improvement in 1987-88 (a difference of .0074). Interpretation of Theil's measure

is difficult but the difference in the coefficients of the two years studied strongly indicates that movement toward greater equity concerned with raising the lower half of students to the state median is very small.

Atkinson's Index

The Atkinson's measure was applied to data for both 1982-83 and 1987-88 with varying E values from $E = .1$ to $E = 10$. The computer was unable to compute for values of E greater than 10. The E value is indicative of the level of distributive desirability. The bottom end of the distribution can be weighted as much as desired. The higher the value of E; the more the concern is for the bottom end of the distribution. The Atkinson's index reflects a pattern that clearly demonstrates that 1982-83 was slightly more equitable than 1987-88 when higher E values were incorporated in the application of the measure. When lower E values were incorporated in the application of the measure, 1987-88 showed to be slightly more equitable than , 1982-83.

Summary and Conclusion

After comparing equity in Arkansas before and after the passage of the present school finance law on fourteen different measures, it seems possible to conclude that slightly less equity exists currently. It would seem that the situation is surely as bad if not worse than in 1982-83, and that the school finance suit should be reopened.

REFERENCES

Robert Berne and Lganna Stiefel. *The Measurement of Equity in School Finance*, Baltimore, MD: the John Hopkins Press, 1984.